

Fig. 2

Fig. 1

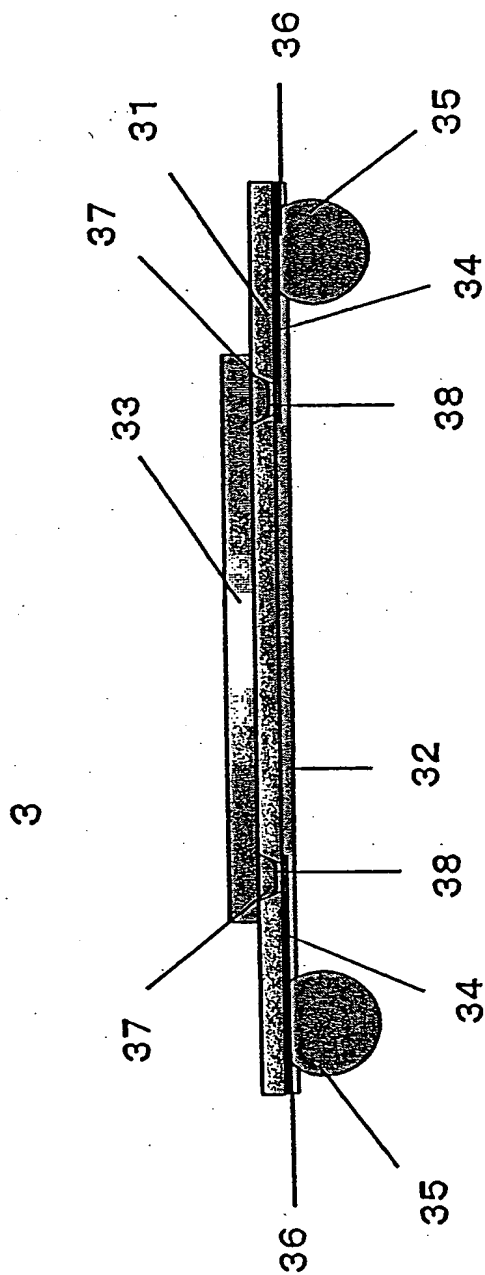


Fig. 3

| | | Ex. 11 | Ex. 12 | Ex. 13 | Ex. 14 | Ex. 15 |
|--------------------------------------|---------------------------|--------|--------|--------|--------|--------|
| First resin | PRIMASET PT-60 | 10 | 10 | 10 | 14 | 10 |
| | PRIMASET PT-60A | | | | | |
| | NC-3000SH | | | | | |
| Second resin | PRIMASET PT-30 | 10 | 10 | 10 | 14 | 10 |
| | LACY | | | | | |
| | EP-830 | | | | | |
| Resin having low moisture absorbency | NC-3000SH | 12 | 12 | 12 | 17 | 12 |
| | ARTON | | | | | |
| Curing agent | MEH-7851-3H | | 8 | 8 | 11 | 8 |
| | PR-51714 | 8 | | | | |
| Filler | SFP-10X | 60 | | | 44 | 60 |
| | FB-5SDX | | 60 | | | |
| | AO-802 | | | 60 | | |
| | | | | | | |
| Reaction rate (%) | | 5 | 5 | 5 | 5 | 5 |
| Evaluations | Flexibility | A | A | A | A | A |
| | Development of tack | A | A | A | B | A |
| | Generation of dust | A | A | A | A | A |
| | Resin flow (%) | 12 | 5 | 15 | 25 | 15 |
| | Processability with laser | B | B | B | B | A |

| | | Ex. 16 | Com. 1 | Com. 2 | Com. 3 | Com. 4 |
|--------------------------------------|---------------------------|--------|--------|--------|--------|--------|
| First resin | PRIMASET PT-60 | | 20 | | 25 | 10 |
| | PRIMASET PT-60A | | | | | |
| | NC-3000SH | 22 | | | | |
| Second resin | PRIMASET PT-30 | | | 20 | 25 | 10 |
| | LACY | | | | | |
| | EP-830 | 10 | | | | |
| Resin having low moisture absorbency | NC-3000SH | | 12 | 12 | 30 | 20 |
| | ARTON | | | | | |
| Curing agent | MEH-7851-3H | 8 | 8 | 8 | 20 | |
| | PR-51714 | | | | | |
| Filler | SFP-10X | 60 | 60 | 60 | | 60 |
| | FB-5SDX | | | | | |
| | AO-802 | | | | | |
| | | | | | | |
| Reaction rate (%) | | 5 | 5 | 5 | 5 | 5 |
| Evaluations | Flexibility | A | D | A | A | A |
| | Development of tack | A | A | D | C | A |
| | Generation of dust | A | D | A | A | A |
| | Resin flow (%) | 25 | 15 | 15 | 40 | 25 |
| | Processability with laser | A | B | B | B | B |

Fig. 4

Table 1

| | | Ex.1 | Ex.2 | Ex.3 | Ex.4 | Ex.5 |
|--------------------------------------|---------------------------|------|------|------|------|------|
| First resin | PRIMASET PT-60 | 10 | 13 | 10 | 10 | |
| | PRIMASET PT-60A | | | | | 10 |
| Second resin | PRIMASET PT-30 | 10 | 13 | 10 | 10 | 10 |
| | LACY | | | | | |
| Resin having low moisture absorbency | NC-3000SH | 12 | 8 | 12 | 12 | 12 |
| | ARTON | | | | | |
| Curing agent | MEH-7851-3H | 8 | 6 | 8 | 8 | 8 |
| | PR-51714 | | | | | |
| Filler | SFP-10X | 60 | 60 | 60 | 60 | 60 |
| | FB-5SDX | | | | | |
| | AO-802 | | | | | |
| Reaction rate (%) | | 5 | 5 | 20 | 30 | 5 |
| Evaluations | Flexibility | A | A | A | A | B |
| | Development of tack | A | A | A | A | A |
| | Generation of dust | A | A | A | B | A |
| | Resin flow (%) | 15 | 20 | 12 | 10 | 10 |
| | Processability with laser | B | B | B | B | B |

| | | Ex.6 | Ex.7 | Ex.8 | Ex.9 | Ex.10 |
|--------------------------------------|---------------------------|------|------|------|------|-------|
| First resin | PRIMASET PT-60 | 10 | 18.5 | 5 | 10 | 15 |
| | PRIMASET PT-60A | | | | | |
| Second resin | PRIMASET PT-30 | | 1.5 | 15 | 10 | 15 |
| | LACY | 10 | | | | |
| Resin having low moisture absorbency | NC-3000SH | 12 | 12 | 12 | | 6 |
| | ARTON | | | | 12 | |
| Curing agent | MEH-7851-3H | 8 | 8 | 8 | 8 | 4 |
| | PR-51714 | | | | | |
| Filler | SFP-10X | 60 | 60 | 60 | 60 | 60 |
| | FB-5SDX | | | | | |
| | AO-802 | | | | | |
| Reaction rate (%) | | 5 | 5 | 5 | 5 | 5 |
| Evaluations | Flexibility | A | B | A | A | A |
| | Development of tack | B | A | B | A | A |
| | Generation of dust | A | B | A | A | A |
| | Resin flow (%) | 20 | 12 | 18 | 20 | 20 |
| | Processability with laser | B | B | B | B | B |

Fig. 4

Table 2

| | | Ex.1a | Ex.2a | Ex.3a | Ex.4a | Ex.5a |
|-------------|--|-------|-------|-------|-------|-------|
| Prepreg | | Ex.1 | Ex.2 | Ex.3 | Ex.4 | Ex.5 |
| Evaluations | Flammability | V-0 | V-0 | V-0 | V-0 | V-0 |
| | Resistance to heat and moisture (sec) | >120 | >120 | >120 | >120 | >120 |
| | Coefficient of thermal expansion (ppm) | 15 | 13 | 15 | 15 | 15 |

| | | Ex.6a | Ex.7a | Ex.8a | Ex.9a | Ex.10a |
|-------------|--|-------|-------|-------|-------|--------|
| Prepreg | | Ex.6 | Ex.7 | Ex.8 | Ex.9 | Ex.10 |
| Evaluations | Flammability | V-0 | V-0 | V-0 | V-1 | V-0 |
| | Resistance to heat and moisture (sec) | >120 | >120 | >120 | >120 | 30 |
| | Coefficient of thermal expansion (ppm) | 25 | 13 | 16 | 17 | 12 |

| | | Ex.11a | Ex.12a | Ex.13a | Ex.14a | Ex.15a |
|-------------|--|--------|--------|--------|--------|--------|
| Prepreg | | Ex.11 | Ex.12 | Ex.13 | Ex.14 | Ex.15 |
| Evaluations | Flammability | V-0 | V-0 | V-0 | V-0 | V-1 |
| | Resistance to heat and moisture (sec) | 30 | >120 | >120 | >120 | >120 |
| | Coefficient of thermal expansion (ppm) | 15 | 15 | 20 | 28 | 30 |

| | | Ex.16a | Com.1a | Com.2a | Com.3a | Com.4a |
|-------------|--|--------|--------|--------|--------|--------|
| Prepreg | | Ex.16 | Com.1 | Com.2 | Com.3 | Com.4 |
| Evaluations | Flammability | V-1 | V-0 | V-0 | V-1 | V-1 |
| | Resistance to heat and moisture (sec) | >120 | >120 | >120 | >120 | 10 |
| | Coefficient of thermal expansion (ppm) | 30 | 12 | 17 | 40 | 15 |

Fig. 5

Table 3

| | | Ex.1b | Ex.2b | Ex.3b | Ex.4b | Ex.5b |
|----------------------------|--|-------|-------|-------|-------|-------|
| Prepreg with metallic foil | | Ex.1 | Ex.2 | Ex.3 | Ex.4 | Ex.5 |
| Evaluations | Thermal cycling test | 0/10 | 0/10 | 0/10 | 0/10 | 0/10 |
| | Insulation resistance after humidification | 0/10 | 0/10 | 0/10 | 0/10 | 0/10 |

| | | Ex.6b | Ex.7b | Ex.8b | Ex.9b | Ex.10b |
|----------------------------|--|-------|-------|-------|-------|--------|
| Prepreg with metallic foil | | Ex.6 | Ex.7 | Ex.8 | Ex.9 | Ex.10 |
| Evaluations | Thermal cycling test | 0/10 | 0/10 | 0/10 | 0/10 | 0/10 |
| | Insulation resistance after humidification | 0/10 | 0/10 | 0/10 | 0/10 | 0/10 |

| | | Ex.11b | Ex.12b | Ex.13b | Ex.14b | Ex.15b |
|----------------------------|--|--------|--------|--------|--------|--------|
| Prepreg with metallic foil | | Ex.11 | Ex.12 | Ex.13 | Ex.14 | Ex.15 |
| Evaluations | Thermal cycling test | 0/10 | 0/10 | 0/10 | 0/10 | 0/10 |
| | Insulation resistance after humidification | 0/10 | 0/10 | 0/10 | 0/10 | 0/10 |

| | | Ex.16b | Com.1b* | Com.2b* | Com.3b | Com.4b |
|----------------------------|--|--------|---------|---------|--------|--------|
| Prepreg with metallic foil | | Ex.16 | Com.1 | Com.2 | Com.3 | Com.4 |
| Evaluations | Thermal cycling test | 0/10 | - | - | 10/10 | 0/10 |
| | Insulation resistance after humidification | 0/10 | - | - | 0/10 | 5/10 |

* no semiconductor packages were manufactured since development of tack and generation of dust were observed in the prepregs prepared in Comparative Examples 1 and 2

Fig. 6